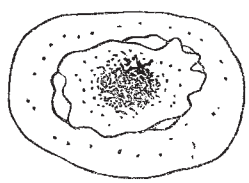
stoma forms, to be analogous to cases of degeneration, or return to an abandoned course of development, rather than to the commencement of a new stage of progress. The adaptational advantages, which caused the larval form to become persistent, ceasing to operate, the Amblystoma form may very possibly, in time, reobtain its reproductive powers and its position as the normally perfect animal of which the Siredon is the larva.

June 28 G. S. BOULGER

Remarks upon a Hailstorm which passed over Belgaum on April 21, 1876

ABOUT 1.30 P.M., after some light rain, large hail-stones commenced falling one here and there, and gradually thickening for ten minutes, were followed up by a sharp shower of rain.

The first stones which fell were of a compressed oval shape, with sides slightly rounded or bulging, about 1 inch in length and $\frac{3}{4}$ inch in breadth, the centre being about $\frac{1}{2}$ inch thick. The centre or nucleus of the stone was about the size of a large pea, and appeared to consist of a mass of infinitesimally minute air-bubbles. Surrounding this nucleus were two collateral tracings—not rings, for they were far from being round—unlike in form, the one occasionally bulging beyond the other :—



Towards the end of the storm the hail-stones decreased in size and assumed a rounded shape, about $\frac{1}{4}$ inch in diameter, with the same internal conformation, but proportionately small compared with the size of the stones. G. A. NEWMAN

Williams' (?) Thermometer

As the Physical Loan Collection at South Kensington includes a new (?) thermometer by Mr. John Williams—I presume the son of the late Secretary of the Astronomical Society—I hereby beg to vindicate my priority therein, as printed in the London *Philosophical Magazine* for January 1850, vol. xxxvi. My communication is dated Dec. 6, 1849, wherein I proposed making the common — 40° F. or C. to be the zero, and the boiling-point of water 1000 ; being 252° F. or 140° C. interval. Also putting zero at — 38° F. to have 250° F. for the extreme difference. This would generally avoid negat. deg. (and even the decimal pointing), merc. freez. — 39 = + 4 or — 4 according to the scale 252 or 250 :—

F. 0 = 158·7	152		F. 150 = 754·0	752
32* = 285·7	280		174 = 849·2	848
39 = 313·5	308		212* = 1000·0	1000
50 = 357·1	352		655 = 2758·0	2772
84 = 492·1	488		672 = 2825·4	2840
98 = 547·6	544			

In a tract on the Limits of the Atmosphere, printed in 1840, I showed that the absolute *zero* of cold is unattainable. Pour any fluid substance in a cylinder, and mark the dilatation points for 32° and 212° F., it is obvious that by carrying the scale downwards to the bottom of the cylinder, that the fluid cannot condense to the very bottom of the vessel, else its density would be infinite. At or before this *lowest* degree of the scale the said fluid will therefore remain stationary or begin to expand upwards, as water does at 32°. I enclose copies printed at the time of my said papers. S. M. DRACH

June 26

The Cuckoo

THERE is a saying in Somersetshire :—

"The Cuckoo sings in April,
The Cuckoo sings in May ;
The Cuckoo sings the day before
But not on Midsummer-day."

This year, the cuckoo sang cheerily on the 24th, and is still singing on the 28th with undiminished vigour. H. M. ADAIR

Taunton

Geology of Zermatt

BEING about to spend some time in the Zermatt district, I should be much obliged if any of your readers could give me through your pages (as the information would doubtless be serviceable to others) the titles of such works on the geology and mineralogy of that portion of the Alps as they can recommend from their own use of them. VIATOR

OUR ASTRONOMICAL COLUMN

THE TOTAL SOLAR ECLIPSE OF 1878, JULY 29.—On March 26 of the present year an *annular* eclipse passed over British Columbia, the sun being high in the heavens and near the meridian when the annulus was formed. On July 29, 1878, the still more interesting phenomenon, a *total* solar eclipse, will be visible in the same district, the track of the central line passing thence over the western states of America to the Gulf of Mexico. Our American *confrères* will no doubt give a good account of it.

The duration of totality attains a maximum in British Columbia, and the present remarks will be confined to the passage of the total eclipse over this country. Employing the *Nautical Almanac* elements, which as regards the moon's place are in very close agreement with those of the American ephemeris founded on the tables of Prof. Peirce, and making a direct calculation for longitude 123° 30′ W., latitude 53° 30′ N., we find the following particulars :—

	h. m. s.		
Totality begins July 29, at	1 32 24	local M.T. at	61° from N.Pt. towards W.
,, ends ,, ,,	1 35 36	,, ,,	118 ,, ,, E.

The duration is therefore 3m. 12s. The sun's altitude at the middle of the eclipse is 52°.

A similar calculation gives for the commencement of the partial eclipse oh. 19m. 47s. local M.T. at 62° from the sun's north point towards the west, altitude 56°.

For any other point not far from the above-assumed position the times of beginning and ending of totality may be deduced from the following formulæ :—

$$\text{Cos. } w = 51{\cdot}5275 - [1\ 84632] \sin. l + [1{\cdot}67405] \cos. l, \cos. (L + 203^\circ\ 44'{\cdot}5)$$
$$t = 9\text{h. } 59\text{m. } 4{\cdot}6\text{s.} \mp [1{\cdot}98350] \sin. w - [3{\cdot}56410] \sin. l - [3{\cdot}86142] \cos. l, \cos. (L + 245^\circ\ 6'{\cdot}7).$$

The beginning of the partial eclipse will be given by—

$$\text{Cos. } w = 0{\cdot}98476 - [0{\cdot}19431] \sin. l + [0{\cdot}00582] \cos. l, \cos. (L + 184^\circ\ 34'{\cdot}7)$$
$$t = 10\text{h. } 19\text{m. } 43\text{s.} - [3{\cdot}65657] \sin. w - [3{\cdot}55998] \sin. l - [3\ 88264] \cos. l, \cos. (L + 227^\circ\ 19'{\cdot}4).$$

In the above formulæ L expresses the west longitude from Greenwich taken *negatively*, l the geocentric latitude, and the quantities within the square brackets are logarithms. Upper sign for beginning of totality, lower sign for ending.

The following figures should define pretty accurately the limits of the belt of totality in British Columbia :—

W. longitude.	Geographical Latitude of N. Limit.	Central Line.	S. Limit.
° ′	° ′	° ′	° ′
126 30 ...	56 22·1 ...	55 11·0 ...	54 1·4
123 30 ...	54 42·6 ...	53 30·7 ...	52 20·5
122 0 ...	53 50·5 ...	52 38·4 ...	51 27·9
120 30 ...	52 56·9 ...	51 44·6 ...	50 33·9
117 30 ...	51 5·3 ...	49 52·5 ...	48 41·4

Fort Fraser, it will be seen, is very nearly on the line of central eclipse.

At a point, longitude 121° 37′ W., latitude 52° 27′, just south of Lake Quesnelle, the central lines of the annular eclipse of March, 1876, and the total eclipse of July, 1878, intersect.

At New Westminster, the capital of British Columbia, the eclipse is partial only, commencing at oh. 30m. and ending at 2h. 59m. local mean times, magnitude 0·95.

BESSEL'S "ABHANDLUNGEN."—The second volume of the reprint of Bessel's astronomical and other memoirs, under the editorship of Dr. Engelmann, of Leipsic, has appeared. The contents relate to the theory of instruments, including the treatises of the great Königsberg

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astronomer on the heliometer, which in his hands acquired so universal a reputation; to sidereal astronomy, with the memoirs relating to the parallax of 61 Cygni, the measures of the principal members of the Pleiades, to which Dr. Engelmann has added a chart of the group containing stars visible in a telescope of 10·11 cm. aperture, or to "about 10·11 magnitude," the stars not found in Argelander's *Durchmusterung* having a distinguishing mark. Several mathematical essays follow.

MIRA CETI.—Reference is often made in treatises on astronomy to the unusual degree of brilliancy attained by this variable star at the maximum of 1779. From the observations of Bode, Herschel, and Wargentin, we have the following particulars of the augmentation and diminution of brightness in that year.

Aug. 22.—Invisible in an ordinary 2-feet telescope.

Sept. 8.—Seen with the same instrument but very faint.

Sept. 18.—Immediately visible to the naked eye according to Herschel. Bode estimated it 4m.

Oct. 5 and 6.—Already much brighter than Menkar (*α* Ceti).

Oct. 15-19.—Equal to *α* Arietis on 15th, and still brighter on the 19th; the light reddish.

Oct. 30.—According to Wargentin, it was equal to Aldebaran and of the same colour, or even of the redness of Mars which was observable the same night. In a 10-feet achromatic Mira shot out vivid red rays. Herschel considered it midway in brightness between *α* Arietis and Aldebaran.

Nov. 2.—There was even an increase, in the judgment of Herschel.

Nov. 11.—Visible as early as Aldebaran and Mars.

Nov. 20.—As bright as, but not brighter than stars of the second magnitude, according to Herschel, but on the 25th much brighter than Menkar, though less than Aldebaran, according to Wargentin.

Dec. 4.—Only equal to *α* Arietis.

Dec. 7 and 10.—So much diminished since Nov. 25, that it was now hardly equal to Menkar, and its colour was now whiter.

Dec. 25.—Before the moon rose, equal to *γ* Ceti, or of the third magnitude.

Dec. 29.—Only a little brighter than the fourth magnitude; not equal to *γ* or *δ* Ceti.

Argelander gives for the date of maximum 1779, Nov. 6.

THE TASMANIANS

THE *historical* period of this singular race of mankind has lasted no longer than a century, for up to one hundred years ago they had unimpeded sway in the island of Van Diemen. Once invaded by Europeans, they had inevitably to succumb, and they gradually but speedily dwindled away, the last of them having died about two years ago, so that now they are completely extinct.

The island when discovered by Tasman contained about 7,000 inhabitants. In the year 1803 it was annexed by Britain for a penal settlement. Hatred, amounting to display of violence, broke out between the aborigines and the criminal occupiers of the soil. The scattered remnants of the native tribes were subsequently gathered together, and provided for by the Government at various retreats, until the last of the race in course of time passed away. Dr. Barnard Davis, F.R.S., the well-known ethnologist, in a recent paper,[1] endeavours to prove by the comparison of a skeleton, and some skulls of an Australian and a Tasmanian, that these two people belonged to two distinct races of man, having been previously erroneously confounded together.

1 "On the Osteology and Peculiarities of the Tasmanians, a Race of Man Recently become Extinct." Reprint 4to from the "Natuurkundige Verhandelingen der Hollandsche Maatschappij der Wetenschappen." 3rd Verz. Deel II., No. 4. Illustrated by four splendid lithographic plates.

Almost the only relics which the Tasmanains have left behind them are their bones. Fortunately before the entire extinction of the race, men of science had begun to see the importance of the study of craniology, so that a few skulls, but still only a few, have been collected and preserved. One chief reason of the scarcity of crania is the manner of the disposal of the dead—by fire. These were often placed in a hollow tree, surrounded by spears, so that on the occurrence of any bush fire the bones even were certain to be consumed. Two out of the twelve skulls in Dr. Davis' collection have been rescued from fire. Up to the last three years there was not a single Tasmanian skeleton in any European collection. At the present time there are four in England—two, one a male and the other a female, being in the Museum of the Royal College of Surgeons. Two skeletons, also of opposite sexes, are in the Museum of the Royal Society of Tasmania, Hobart Town.

The chief works of art, of which, unfortunately, but few are preserved, consist of beautiful necklaces made by stringing the iridescent shells of *Purpura elenchus* upon thin sinews, also of very rude implements, chippings of a dark-coloured chert, exactly like that used by the Kanakas of the Sandwich Islands, and, lastly, fishing nets. The natives on the south and west coasts make a kind of "catamaran" from rushes. The spears, about ten feet long, are made of the heavy, hard wood of the "tea tree" pointed and hardened in the fire, and straightened by being passed from end to end between the teeth.

For long the Tasmanians and Australians were confounded together, and Europeans who visited the country did not improve matters by calling both races, without distinction, "black," though the colour of their skin was removed from a negroid blackness, being of a "dull dark" colour in the Tasmanian, and "chocolate, coffee-coloured, or nutmeg-coloured" in the Australian.[1] There was, moreover, a striking difference between the two people, the Tasmanian being stout and broad-shouldered, while there was such a degree of lankness in the Australian as to cause the former to appear stout. Prof. Huxley, who visited both countries, says of the former people that they "are totally different from the Australians."

The Tasmanians were rather short, being below the average of Europeans in stature. The mean height of twenty-three men was found to be 5 ft. 3¼ in., or 1,618 mm.; that of twenty-nine women was only 4 ft. 11¼ in., or 1,503 mm. There are, however, instances, as in other races, of tall stature among the Tasmanians, for several have been found to be 6 ft. in height by measurement. The Australians are a taller people. Out of thirteen Shark's Bay natives who were measured twelve were 5 ft. 10 in. in height, but "there seems," observes Mr. Oldfield, "as much variation among these savages as there is among civilised nations, the mean height being no greater than it is in England." The Tasmanians differed strikingly from the Australians in being robuster; and that this is no superficial character, but one of race, can be proved by reference to their bones. A question, now unfortunately too late to solve, is—What was the amount of difference between the different tribes of Tasmania? For it is known that there were tribes in the island differing to the extent of the possession of dialects mutually unintelligible. With regard to the Australians, some ethnologists maintain that they have physical characters so distinct as to admit of being divided into a woolly-haired and a flowing-haired race.

There is, moreover, a striking difference in the structure of the hair in the two races respectively; that of the Australians growing in flowing ringlets, while the hair of the Tasmanian, being excentrically elliptical on section, has a tendency to twist, and thus comes to grow in small

1 It is to be hoped that in future, in order to avoid such vagueness of terminology, travellers will adopt M. Broca's useful colour-types. *Vide* the British Association's "Anthropological Notes and Queries."

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